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Remarks/Arguments

In the Non-Final Office Action mailed on 18 January 2006, the Examiner objected to various aspects of the drawings and the specification, objected to claims 1-3, 12, 14, and 15, rejected claims 1-14 under 35 U.S.C. §112, second paragraph as indefinite, rejected claims 1-5, and 10 under 35 U.S.C. §103(a) as unpatentable over Yao (United States Patent Publication Number 2003/0084219) in view of Bakke (United States Patent Publication Number 2005/0071532), and rejected claims 6-9 and 15-16 as unpatentable over Yao in view of Bakke and further in view of Barrow (United States Patent Publication Number 2002/0188786). The Examiner found claims 11-14 allowable if re-written to overcome the §112 rejection and found claims 17-18 allowable if rewritten appropriately to overcome the §103 rejection.

Applicants have amended the specification to overcome the Examiner's objections to the drawings and the specification, have amended claims 1-3, 6-7, 12, and 15 to overcome the Examiner's objections and §112 rejections and for editorial clarity. Applicants respectfully traverse the Examiner's rejections under §103, have amended claims 1 and 15 for editorial clarity, and respectfully request reconsideration and withdrawal of all outstanding objections and rejections.

Drawings

The Examiner objected to the drawings noting that figure 5 shows two internal ports (512 and 514) associated with SAS expander component 598 and then notes that the descriptive text on page 9 discusses six (6) internal ports (512 through 522) associated with component 598. The Examiner requested correction of the drawing. Applicants thank the Examiner for the careful reading of the application. Rather than amend the drawings, Applicants have amended the descriptive text on page 9 of the specification to match the exemplary representation in the drawings. There is no particular relevance to the number of internal ports shown to be associated with component 598. The error simply reflected a simplification of the drawing that was not properly made in the descriptive text. As noted in the specification, any number of such internal ports may be associated with a component of the system shown. No new matter is added by this

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amendment since figure 5 clearly shows the structure as now described in the amended portion of the specification.

In view of the amendment to the specification, Applicants respectfully request reconsideration and withdrawal of the objection to figure 5.

Specification

The Examiner objected to the specification noting two typographic errors in the specification. Again, Applicants thank the Examiner for the careful reading of the application and apologize for the errors. Applicants have amended the specification to correct the typographic errors in accordance with the Examiner's helpful suggestions. No new matter is added by these amendments since they are merely corrections of obvious typographic errors.

Applicants therefore respectfully request reconsideration and withdrawal of the objection to the specification.

Claim Objections

The Examiner raised specific objections to claims 1-3, 12, 14, and 15 due to certain phrases deemed indefinite. In particular, the Examiner requested that the acronyms "SAS" and "SMP" be defined in their respective first uses in the claims (e.g., in claims 1, 12, and 15). Applicants have amended claims 1, 12, and 15 to provide the requested well known definitions of the acronyms.

The Examiner also suggested that "PHY" be similarly defined in its first use in claim 14. With due respect, Applicants note that "PHY" is not an acronym but rather a term of art defined in the SAS specifications well known to those of ordinary skill in the art. This term of art is well understood in the SAS storage system environment and need not be further defined.

The Examiner also noted an improper antecedent basis for the phrase "plurality of SAS expanders" as used in claims 2 and 3. Applicants have corrected the improper antecedent bases in claims 2 and 3 in accordance with the Examiner's helpful suggestion.

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The amendments to claims 1-3, 12, and 15 do not narrow the scope of the claims but rather merely serve to clarify that which the Examiner noted as indefinite (though for purposes of examination the Examiner properly understood the noted terms and phrases). In view of the amendments to claims 1-3, 12, and 15 and the above discussion of the term "PHY", Applicants respectfully request reconsideration and withdrawal of the objections to claims 1-3, 12, 14, and 15.

§112 Claim Rejections

The Examiner rejected claims 1-14 under 35 U.S.C. §112, second paragraph as indefinite. In particular, the Examiner suggests that it is unclear in claim 1 (and hence all claims dependent therefrom) what the internal fabric is coupling. The Examiner correctly understood that the internal fabric as recited in claim 1 couples various internal ports to one another.

Applicants have amended claim 1 to clarify this intended meaning. This amendment does not narrow the scope of the claims in that it merely serves to clarify that which the Examiner properly understood and that which Applicants suggest was clearly recited in the claims as filed. This intended meaning is clear from all supporting words and figures of the application. The internal fabric as depicted and as described throughout the patent application serves the principle purpose of coupling internal ports of the various SAS expander component circuits of the MCM.

The Examiner further objected to claims 6 and 7 suggesting that it is not clear how a "static fabric" is configured at reset of the MCM. The Examiner suggests that the specification at page 7 lines 23-25 suggests that a static fabric is never modified during operation.

The Examiner correctly site one embodiment of the invention on page 7 of the specification in which a static internal fabric is configured at time of manufacture and never changes. However, the very next paragraph on page 7 and continuing to page 8 notes another embodiment of a static fabric - one which is initially configured at reset of the MCM and *then* is unchanged through further operation of the MCM (e.g., until a next

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reset). Thus the "static fabric" is unchanged during operation of the MCM once it is initially configured. In particular, this paragraph of the specification reads:

Other aspects hereof provide that internal switch fabric 302 may be dynamically programmed to provide switchable conductive paths between internal ports of the various standard expander components within MCM expander 300. In such a case, control and coordination element 304 provides desired switch control selection for paths between the various internal ports of the standard expander components. Control and coordination element 304 may therefore comprise programmed or programmable logic for coupling internal ports of the standard port expanders through internal switch fabric 302. The program logic within control and coordination element 304 may therefore provide a static configuration for coupling of internal ports of standard expander components within MCM expander 300 such that the static configuration is established at reset of the MCM expander 300 rather than at time of manufacture. Alterations in the program logic of control and coordination element 304 may provide a different static configuration set of the MCM expander 300.

Although Applicants feel it is clear that the term "static fabric" may refer to both such embodiments (configured at manufacture and configured by logic at reset of the MCM), Applicants have amended claims 6 and 7 to more clearly recite that it is the "internal fabric" that is configured at reset of the MCM. In addition, claim 6 is now dependent from claim 1. Thus the adjective "static" is removed to overcome the Examiner's rejection. Applicants maintain that the "internal fabric" is understood as a "static" fabric throughout the specification and claims. Static in that once configured it does not change - at least until a reset condition or signal is applied to the MCM. This amendment does not narrow the claims but rather broadens the claims somewhat to simply recite that the internal fabric is configured at MCM reset (regardless of whether such a fabric is considered "static" or not).

Dependent claims 2-5 and 8-14 were rejected as dependent from these rejected claims.

In view of the amendments to claims 1, 6, and 7 and the above discussion, Applications respectfully request reconsideration and withdrawal of the rejection of claims 1-14 under §112.

§103 Claim Rejections

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The Examiner rejected claims 1-5 and 10 under 35 U.S.C. §103(a) as unpatentable over Yao in view of Bakke and rejected claims 6-9 and 15-16 under 35 U.S.C. §103(a) as unpatentable over Yao in view of Bakke and further in view of Barrow. As regards independent claim 1, the Examiner suggests that Yao shows all the features as claimed in the "switching system" 10 of his figure 1. The Examiner suggests only that Yao fails to suggest that the system is a SAS expander and points to Bakke as showing such a device. The Examiner suggests that one of ordinary skill in the art is motivated to combine the references

... for the purpose of implementing resilient connectivity in a data processing network (see Bakke, Page 1, paragraph 11). Also, it would have been desirable as stated by Bakke for the data processing network system to prevent loss of data through increased fault tolerance (see Bakke, Page 1, paragraphs 2-3). Yao provides motivation to combine by stating it is an object of the invention to provide connectivity between a variety of protocols in a switching system (see Yao, Page 1, paragraphs 4-5).

Though Applicants take issue with the Examiner's suggested motivation for such a combination, the proposed combination still fails to teach or reasonably suggest every element of the rejected claim. First and foremost, nothing in the art of record (considered individually or in any combination teaches or reasonably suggests a SAS expander implemented as a Multi-Chip Module ("MCM") - the very essence of the invention. This key aspect is more than the mere integration of elements in a chip design. The internal fabric of the claimed invention provides static connections/routes among the internal ports of the various SAS expander component circuits of the MCM. The static connections/routes are static (as discussed above) in that they remain unchanged during operation of the MCM. The configuration may be determined either at time of manufacture of the MCM or based on programmable logic used when the MCM is reset (e.g., powered up or otherwise reset to a powered up state). Nothing in the prior art of record, alone or in any combination, shows such a SAS expander system/circuit design in which the couplings/routes within the MCM implemented SAS expander, once determined, remain static for the remaining period of operation of the MCM only to be changed upon a reset of the MCM (if ever changed after manufacture).

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Applicants have amended claim 1 to clarify this feature of the MCM SAS expander. Specifically, claim 1 has been amended to clarify that the configuration of the coupling of the internal ports remains static after the MCM is initialized. By contrast, a typical SAS expander or switching system may dynamically establish and remove routes (e.g., may dynamically reconfigure). No such dynamic reconfiguration of the recited internal ports is permitted in the present invention. Rather, the configuration is determined when the MCM initializes (e.g., at time of manufacture or as reprogrammed at reset of the MCM) and remains static thereafter (e.g., until the MCM is again reset). Thus the simpler SAS expander customized and configured as an MCM provides low cost customized SAS expanders for integration into SAS systems.

In view of the amendment to claim 1 and the above discussion, Applicants maintain that claim 1 is allowable over all art of record. Independent claim 15 recites a method for creating such a SAS expander as an MCM and was rejected for similar reasons. Claim 15 has been similarly amended to clarify the static nature of the internal fabric of the MCM SAS expander. Applicants therefore urge that claim 15 is allowable for at least the same reasons as above with respect to claim 1.

Dependent claims 2-10 and 16 are maintained to be allowable for at least the same reasons as claims 1 and 15 and as dependent from allowable base claims.

Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1-10 and 15-16 under §103.

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Conclusion

Applicants have amended the specification to overcome the Examiner's objection to both the drawings and to the specification per se. Applicants have amended claims 1-3, 12, and 15 to overcome the Examiner's objections to various claims. Applicants have amended claims 1, 6, and 7 to overcome the Examiner's rejection of various claims under §112. Applicants have amended claims 1 and 15 to clarify a distinction over the prior art of records applied in the Examiner's §103 rejections. Applicants have addressed each issue raised by the Examiner and respectfully request reconsideration and withdrawal of all outstanding objections and passage of the application to allowance and issue.

Applicants believe no fees are due in this matter. Should any issues remain, the Examiner is encouraged to telephone the undersigned attorney.

Respectfully submitted,



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